electrode located on the board side and the bump located on the electronic component side can be reduced when the conductive particles are placed between the bump and the board electrode in directly bonding the bump to the board electrode.

Although the conventional leveling process has been performed in order to shape the bump height constant at the time of bonding to the board electrode, the crushing of the bump can be performed concurrently with the bonding to the electrode according to the present invention. Therefore, no independent leveling process is needed, and the bonding can be achieved while correcting the warp and undulation of the circuit board by deforming the same, or the bonding is achieved while correcting the warp and undulation of the circuit board by deforming the same at the time of bonding without the need for the leveling process of the bumps by hardening the conductive paste stuck to the bumps and deforming the conductive paste at the time of bonding. Accordingly, this arrangement tolerates the warp and undulation.

There are needed a high-accuracy board and the uniform leveling of the bumps, as exemplified by 10 μm per IC chip (meaning that a thickness warp dimension accuracy of 10 μm per IC chip is needed) in the first prior art, 2 μm per IC chip in the second prior art, and 1 μm per IC

chip in the third prior art (bump height variation of not greater than ± 1 μm). In practice, a glass board represented by LCD is employed. In contrast to this, according to the present invention, the bonding is achieved while correcting the warp and undulation of the circuit board by deforming the same at the time of bonding. Therefore, a board of a degraded surface flatness including warp and undulation, exemplified by a resin board, a flexible board, a multilayer ceramic board, or the like, can be employed, and a less expensive versatile IC chip bonding method can be provided.

If the volume of the insulating resin located between the electronic component and the circuit board is set greater than the volume of the space between the electronic component and the circuit board, then the resin flows out of this space, producing the encapsulating effect. Therefore, it is not required to lay an encapsulation resin (underfill coat) under the IC chip after the bonding of the IC chip to the circuit board with the conductive adhesive, which has been needed in the first prior art, and the process can be shortened.

By mixing the inorganic filler with the insulating resin by about 5 to 90 wt% of the insulating resin, the elastic modulus and the coefficient of thermal expansion of the insulating resin can be controlled to be

optimum for the board. In addition to this, if this is utilized for the ordinary plating bump, then the inorganic filler enters the space between the bump and the circuit board, degrading the bonding reliability. However, if the stud bump (forming method utilizing wire bonding) is employed as in the present invention, then the inorganic filler and also the insulating resin are forced outwardly of the bumps by the pointed bumps that enter the insulating resin at the beginning of the bonding. By this operation, the inorganic filler and the insulating resin are forced outwardly of the space between the bumps and the electrodes in the process of the deformation of the pointed bumps, and the unnecessary interposed object can be eliminated, allowing the reliability to be further improved.

When the inorganic filler of the same weight is mixed, by employing larger inorganic filler that has a mean particle diameter of not smaller than 3 μm, employing an inorganic filler that has a plurality of different mean particle diameters, employing inorganic fillers in which the mean particle diameter of one inorganic filler is two times or more different from the mean particle diameter of the other inorganic filler, or employing at least two types of inorganic fillers in which one inorganic filler has a mean particle diameter exceeding 3 μm and the other inorganic filler has a mean particle diameter of not